

WHAT IS CLAIMED IS:

1. A method of manufacturing a wear resistant shoe,  
comprising:

5 cold-heading one end portion of a generally cylindrical blank to  
radially increase and axially diminish the dimensions of the one end  
portion, and to work harden the one end portion while leaving an opposite  
end portion dimensionally unchanged; and

10 subsequently cold-working and thereby hardening the opposite end  
portion.

2. The method of claim 1, including the additional steps of:  
machining the cold-headed blank prior to cold-working to form a  
hollow skirt in said opposite end portion for receiving a rounded end of a  
piston rod.

15 3. The method of claim 2, wherein the step of cold-working  
comprises crimping the skirt about a received piston rounded end, joining  
the shoe and piston, and work hardening the skirt.

4. The method of claim 3, further including the step of machining  
the one end portion to predetermined final dimensions subsequent to the  
20 step of cold-heading and prior to the step of crimping.

5. The method of claim 3, further including the step of machining  
the cold-headed end portion to form a cam engaging wear resistant  
surface.

25 6. The method of claim 5, further including the step of surface  
hardening the machined cam engaging surface.

7. The method of claim 6, wherein the step of surface hardening  
comprises application of a TiN material.

8. A wear resistant shoe manufactured according to the process of  
claim 1.

30 9. The method of claim 1, wherein the cylindrical blank comprises  
an alloy of cobalt

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10. A method of manufacturing a wear resistant shoe, comprising:  
work hardening a portion of a cylindrical member to a substantial  
depth;

5       machining the cylindrical member portion to finished dimensions;  
and  
      surface hardening a face of the machined cylindrical member  
portion.

10       11. The method of claim 10, including the additional step of  
machining another portion of the cylindrical member to form a hollow skirt  
in said another portion for receiving a rounded end of a piston rod.

12. The method of claim 11, including the further step of crimping  
the hollow skirt about the rounded end, the crimping imparting an  
increased hardness to the cylindrical member close to the crimp.

15       13. A wear resistant shoe having a surface hardened face for  
engaging a cam, a socket for providing a pivotal coupling to a piston rod,  
and a work hardened foundation in the face region for providing rigid  
support for the surface hardened face.

14. The shoe of claim 13, wherein the socket is crimped around a  
rounded portion of a piston and work hardened by the crimping.

20       15. A method of forming and assembling a piston and wear  
resistant shoe, the shoe formed from rod stock of a diameter less than the  
greatest diameter of the finished shoe, comprising:

      upsetting one end portion of the rod stock to axially reduce and  
radially increase the dimensions of the one end portion:  
25       forming a hollow region in an opposite rod stock end portion; and  
      crimping the periphery of the hollow region about a rounded end of  
the piston rod.

16. The method of claim 15 further comprising the step of work  
hardening the one end portion during the upsetting step.

30       17. The method of claim 16 further comprising the step of surface  
hardening the upset one end.

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22. The method of claim 19, wherein the step of crimping work hardens the one end portion.